CLAIMS

What is claimed is:

1. A 2x2 optical switch comprising:

a first dual-fiber collimator comprising a first pair of optical fibers, the first pair of optical fibers including a first input fiber and a first output fiber;

a second dual-fiber collimator comprising a second pair of optical fibers, the second pair of optical fibers including a second input fiber and a second output fiber;

a switching prism movable between a first position and a second position, wherein:

in the first position, the switching prism is positioned to direct light from the first input fiber to the second output fiber, and direct light from the second input fiber to the first output fiber; and

in the second position, the switching prism is positioned out of an optical path of light emitted from the first input fiber and the second input fiber;

a first planar mirror facing the first collimator, and aligned to reflect light from the first input fiber into the first output fiber when the switching prism is in the second position; and

a second planar mirror facing the second collimator, and aligned to reflect light from the second input fiber into the second output fiber when the switching prism is in the second position.

2. The switch of claim 1, wherein:

the first collimator and the second collimator are substantially parallel and face opposite directions, and

the switching prism is parallelepiped-shaped.

3. The switch of claim 1, wherein:

the first collimator and the second collimator are substantially parallel and face a common direction; and

the switching prism is a dovetail prism.

4. The switch of claim 1, wherein:

the first mirror is positioned substantially a distance D_c away from an endface of the first collimator; and

the switching prism is sized and positioned according to a relation

$S + (L/2 + W/2)/n = D_c$,

wherein S is a distance between the endface of the first collimator and a transmissive face of the switching prism, W is a width of the switching prism along a direction parallel to a longitudinal central axis of the first collimator, L is a length of the switching prism along a direction perpendicular to the longitudinal central axis of the first collimator, and n is an index of refraction of the switching prism.

5. An optical switching method comprising:

positioning a switching prism in a first position in an optical path between a first dual-fiber collimator comprising a first pair of optical fibers, and a second dual-fiber collimator comprising a second pair of optical fibers,

employing the switching prism in the first position to direct light from an input fiber of the first collimator into an output fiber of the second collimator, and to direct light from an input fiber of the second collimator into an output fiber of the first collimator;

positioning the switching prism in a second position out of an optical path of light emitted from the input fiber of the first collimator and the input fiber of the second collimator;

reflecting light emitted from the input fiber of the first collimator into the output fiber of the first collimator when the switching prism is in the second position; and

reflecting light emitted from the input optical fiber of the second collimator into the output fiber of the second collimator when the switching prism is in the second position.

6. The method of claim 5, wherein:
the first collimator and the second collimator are substantially parallel and face opposite directions, and
the switching prism is parallelepiped-shaped.

7. The method of claim 5, wherein:
the first collimator and the second collimator are substantially parallel and face a common direction; and
the switching prism is a dovetail prism.

8. The method of claim 5, wherein:
the first mirror is positioned substantially a distance D_c away from an endface of the first collimator; and
the switching prism is sized and positioned according to a relation
$S + (L/2 + W/2)/n = D_c$,
wherein S is a distance between the endface of the first collimator and a transmissive face of the switching prism, W is a width of the switching prism along a direction parallel to a longitudinal central axis of the first collimator, L is a length of the switching prism along a direction perpendicular to the longitudinal central axis of the first collimator, and n is an index of refraction of the switching prism.

9. An optical switch comprising:
a first dual-fiber collimator comprising a first pair of optical fibers;
a second fiber collimator comprising an output optical fiber;
a switching prism movable between a first position and a second position, wherein:
in the first position, the switching prism is positioned to direct light from an input fiber of the first collimator into the output fiber of the second collimator, and

in the second position, the switching prism is positioned out of an optical path of light emitted from the input fiber of the first collimator; and

a first mirror facing the first collimator, and aligned to reflect light from the input fiber of the first collimator into an output fiber of the first collimator when the switching prism is in the second position.

10. The switch of claim 9, wherein:

the first collimator and the second collimator are substantially parallel and face opposite directions, and

the switching prism is parallelepiped-shaped.

11. The switch of claim 9, wherein:

the first collimator and the second collimator are substantially parallel and face a common direction; and

the switching prism is a dovetail prism.

12. The switch of claim 9, wherein the second collimator is a dual-fiber collimator including a second pair of optical fibers, the second pair of optical fibers including the output fiber of the second collimator.

13. The switch of claim 12, further comprising a second mirror facing the second collimator, and aligned to reflect light from an input fiber of the second collimator into the output fiber of the second collimator.

14. The switch of claim 9, wherein:

the first mirror is positioned substantially a distance D_c away from an endface of the first collimator; and

the switching prism is sized and positioned according to a relation

$S + (L/2 + W/2)/n = D_c$,

wherein S is a distance between the endface of the first collimator and a transmissive face of the switching prism, W is a width of the switching prism along a direction parallel to a longitudinal central axis of the first collimator, L is a length of the switching prism along a direction perpendicular to the longitudinal central axis of the first collimator, and n is an index of refraction of the switching prism.

15. An optical switching method comprising:

positioning a switching prism in a first position in an optical path between a first dual-fiber collimator comprising a first pair of optical fibers, and a second fiber collimator comprising an output optical fiber,

employing the switching prism in the first position to direct light from an input fiber of the first collimator into the output fiber of the second collimator,

positioning the switching prism in a second position out of an optical path of light emitted from the input fiber of the first collimator; and

reflecting light emitted from the input fiber of the first collimator into an output fiber of the first collimator when the switching prism is in the second position.

16. The method of claim 15, wherein:

the first collimator and the second collimator are substantially parallel and face opposite directions, and

the switching prism is parallelepiped-shaped.

17. The method of claim 15, wherein:

the first collimator and the second collimator are substantially parallel and face a common direction; and

the switching prism is a dovetail prism.

18. The method of claim 15, wherein the second collimator is a dual-fiber collimator including a second pair of optical fibers, the second pair of optical fibers including the output fiber of the second collimator.

19. The method of claim 18, further comprising reflecting light emitted from an input fiber of the second collimator into an output fiber of the first collimator when the switching prism is in the second position.

20. The method of claim 15, wherein:

the first mirror is positioned substantially a distance D_c away from an endface of the first collimator; and

the switching prism is sized and positioned according to a relation

$S + (L/2 + W/2)/n = D_c$,

wherein S is a distance between the endface of the first collimator and a transmissive face of the switching prism, W is a width of the switching prism along a direction parallel to a longitudinal central axis of the first collimator, L is a length of the switching prism along a direction perpendicular to the longitudinal central axis of the first collimator, and n is an index of refraction of the switching prism.